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Self assembling nanogels

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Polymeric nanogels - also referred to as hydrogel nanoparticles, macromolecular micelles or polymeric nanoparticles - are emerging as promising drug carriers for therapeutic applications. These nanostructures hold versatility and properties suitable for the delivery of bioactive molecules, namely biopharmaceuticals. The polymer and the production methodology used are fundamental options. These systems may be obtained by incorporation of targeting moieties, detectable probes and/or degradable bonds allowing a controlled release in the physiologic environment which lead to smart systems reactive to physiologic stimuli, etc. A particular challenge in this field is the development of preparation procedures avoiding the use of organic solvents or surfactants.

The production of self-assembled nanogels made of polysaccharides is thus a promising approach for the development of delivery systems. Amphiphilic molecules, obtained from polysaccharides - such as dextrin, chitosan or glycol-chitosan, mannan, hyaluronic acid - self-assemble in aqueous medium, originating nanoparticulate material holding hydrophobic cores which may hold, carry and eventually release pharmaceuticals, including biopharmaceuticals. The production and characterization of these materials, the study of the interaction with therapeutic proteins (IL10) and low molecular weight hydrophobic drugs, a comprehensive characterization of biocompatibility, including cytotoxicity, intracellular trafficking, biodistribution, are among the completed tasks in this field. The development of adjuvant formulations for vaccination and delivery systems is the final goal.

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